

In the Claims:

Please amend claim 1 as follows:

1. (currently amended) An apparatus for monitoring the dynamic loading rate ~~on support systems of for~~ a mobile roof support unit used in an underground mine to withstand abutment pressure, the apparatus comprising:

at least one load sensing device adapted to be coupled to one or more ~~of the hydraulic~~ support systems of the mobile roof support unit used in the underground mine;

a programmable controller for processing pressure change information for the one or more hydraulic support ~~system loading systems of the mobile roof support unit, wherein the pressure change information is determined via~~ information received from said at least one load sensing device; and

a plurality of sensory indicators located in the vicinity of said at least one load sensing device and controlled by said programmable controller ~~to provide, wherein the plurality of sensory indicators located in the vicinity of said at least one load sensing device indicate loading rate for the mobile roof support unit on a real-time basis during mining operations as determined via the pressure change information for the one or more hydraulic support systems of the mobile roof support unit, wherein indicating loading rate for the one or more of the hydraulic support systems of the mobile roof support unit comprises providing~~ timely warning indications used as an aid in determining when to install additional support systems and alert miners of dangerous loading conditions on the support systems of the mobile roof support unit ~~during mining operations on a real-time basis.~~

2. (original) An apparatus as recited in claim 1 wherein said load sensing device comprises a pressure transducer.

3. (original) An apparatus as recited in claim 1 wherein said load sensing device comprises a strain gauge.

4. (canceled)

5. (canceled)

6. (previously presented) An apparatus as recited in claim 1 wherein said programmable controller comprises an embedded microprocessor.

7. (original) An apparatus as recited in claim 1 wherein said programmable controller monitors loading rate changes on said load sensing device installed on the support systems.

8. (original) An apparatus as recited in claim 7 wherein said programmable controller calculates the loading rates on said load sensing device.

9. (original) An apparatus as recited in claim 7 wherein said plurality of sensory indicators comprise various color visual indicators including multicolor strobes, light-emitting diodes (LEDs), fluorescent visual indicators and the like.

10. (original) An apparatus as recited in claim 9 wherein said programmable controller is programmed to sequentially activate different color lights as the loading rate increases on the support systems.

11. (original) An apparatus as recited in claim 7 wherein said plurality of sensory indicators comprise audible alarm indicators.

12. (currently amended) An apparatus for monitoring ~~the~~ dynamic loading rate on ~~support systems of for~~ a mobile roof support unit used in an underground mine to withstand abutment pressure, comprising:

at least one load sensing device coupled to one or more ~~of the~~ hydraulic support systems of the mobile roof support unit;

means for receiving ~~support system loading~~ hydraulic pressure information from said at least one load sensing device;

means for determining the loading rate on the support systems using the received ~~loading~~ hydraulic pressure information; and

means for activating sensory warning indicators located in the vicinity of said at least one load sensing device responsive to said determining means to provide ~~timely warning~~ real-time indications of the dynamic loading rate for the mobile roof support unit during mining operations, wherein said real-time indications are used as an aid in determining when to install additional support systems and alert miners of dangerous loading conditions on the support systems of the mobile roof support unit ~~during mining operations on a real-time basis.~~

13. (original) An apparatus as recited in claim 12 wherein said determining means identifies changes in the loading rate on the support systems.

14. (previously presented) An apparatus as recited in claim 13 further comprising means for sequentially activating different color lights and audio alarms as the loading rate increases on the support systems.

15. (currently amended) A method of monitoring the dynamic loading rate on support systems of a mobile roof support unit used in an underground mine to withstand abutment pressure, the method comprising:

receiving support system loading information from at least one load sensing device coupled to the hydraulic-based support systems of the mobile roof support unit, wherein the support system loading information comprises hydraulic pressure information;

determining the load rate on the support systems using the received loading information; and

activating sensory ~~warning~~ indicators located in the vicinity of said at least one load sensing device to provide timely real-time dynamic loading rate indications as determined via the hydraulic pressure information and used as an aid in determining when to install additional support systems and alert miners of dangerous loading conditions on the support systems of the mobile roof support unit during mining operations ~~on a real-time basis~~.

16. (previously presented) A method as recited in claim 15 wherein determining the load rate on the support systems comprises identifying changes in the loading rate on the support systems.

17. (original) A method as recited in claim 16 wherein said activating step provides warning indications in response to said identifying step.

18. (original) A method as recited in claim 17 comprising the step of sequentially activating different color lights as the loading rate increases on the support systems.

19. (previously presented) The method as recited in claim 15 further comprising: hydraulically coupling at least one of the load sensing devices to one or more of the support systems of the mobile roof support unit during installation.

20. (previously presented) A method as recited in claim 15 further comprising: welding at least one of the load sensing devices onto the support systems during installation.

21. (previously presented) An apparatus for monitoring ~~the~~ dynamic loading rate on support systems of a mobile roof support machine to withstand abutment pressure, the apparatus comprising:

at least one load sensing device adapted to be coupled to one or more ~~of the hydraulic~~ support systems of the mobile roof support machine;

a programmable controller for processing pressure information for the one or more hydraulic support system-loading systems of the mobile roof support machine, wherein the pressure information is determined via information received from said at least one load sensing device; and

at least one sensory indicator located in the vicinity of said at least one load sensing device and controlled by said programmable controller ~~to provide, wherein the at least one sensory indicator located in the vicinity of said at least one load sensing device indicates loading rate on a real-time basis during mining operations as determined via the pressure information for the one or more hydraulic support systems of the mobile roof support machine, wherein indicating loading rate for the one or more of the hydraulic support systems of the mobile roof support machine comprises providing~~ timely warning indications used as an aid in determining when to install additional support systems and alert workers of dangerous loading conditions on the support systems of the mobile roof support machine ~~on-a real-time basis.~~

22. (previously presented) The apparatus of claim 12 wherein the means for determining support system loading information is programmable.

23. (previously presented) The method of claim 15 wherein the determining is performed by a programmable controller.

24. (currently amended) An apparatus for monitoring ~~the~~ dynamic loading rate on support systems of a ~~mobile roof support~~ unit ~~to withstand abutment pressure, the apparatus~~ comprising:

at least one load sensing device adapted to be coupled to one or more of the support systems of the ~~mobile roof support~~ unit to monitor pressure inside one or more hydraulic jacks associated with the ~~mobile roof support~~ unit;

a programmable controller for processing support system loading information received from said at least one load sensing device and determine the dynamic loading rate via the monitored pressure inside the one or more hydraulic jacks associated with the unit; and

at least one sensory indicator located in the vicinity of said at least one load sensing device and controlled by said programmable controller to alert workers of dangerous the dynamic loading rate conditions on the support systems of the ~~mobile roof support~~ unit on a real-time basis as determined via the monitored pressure inside the one or more hydraulic jacks associated with the unit.

25. (previously presented) The apparatus as recited in claim 1 comprising at least one sensory indicator indicating safe conditions in the underground mine.

26. (previously presented) The apparatus of claim 25 wherein the at least one sensory indicator indicating safe conditions in the underground mine comprises a green light.

27. (previously presented) The apparatus as recited in claim 12 wherein the means to provide timely warning indications used as an aid in determining when to install additional support systems and alert miners of dangerous loading conditions on the support systems during mining operations comprises an indicator indicating safe conditions.

28. (previously presented) The apparatus as recited in claim 27 wherein the indicator indicating safe conditions comprises a green light.

29. (previously presented) One or more computer-readable media comprising computer-executable instructions for performing the method of claim 15.

30. (previously presented) The apparatus of claim 1 wherein the programmable controller comprises a communications interface operable to receive values for controlling the sensory indicators.

31. (previously presented) The apparatus of claim 12 wherein the means for activating sensory warning indicators is operable to receive a value via a communications interface means, and the value affects under what conditions the sensory warning indicators are activated.

32. (previously presented) The method of claim 15 further comprising setting a value received via a communications interface at a location local to said at least one load sensing device, wherein the value affects activation of one or more of the sensory warning indicators.

33. (previously presented) The apparatus of claim 21 wherein the programmable controller is operable to set one or more programmable values which help determine when to install additional support systems and alert workers of dangerous loading conditions on the support systems.

34. (previously presented) The apparatus of claim 24 wherein the programmable controller is operable to set programmable values based at least on part on the loading conditions on the support systems.

35. (previously presented) The apparatus of claim 1 wherein the mobile roof support unit comprises a mobile retreat mining unit with a plurality of hydraulic cylinder support systems, crawler tracks, and a canopy, said mining unit used to withstand the abutment pressure of the underground mine.

36. (previously presented) The apparatus of claim 1 wherein the at least one load sensing device adapted to be coupled to one or more of the support systems of the mobile roof support unit used in the underground mine monitors pressure inside one or more hydraulic jacks associated with the mobile roof support unit.

37. (previously presented) The apparatus of claim 12 wherein the means for determining the loading rate on the support systems using the received loading information comprises means to monitor pressure inside one or more hydraulic jacks.

38. (previously presented) The apparatus of claim 21 wherein at least one load sensing device adapted to be coupled to one or more of the support systems of the mobile roof support machine comprises a pressure transducer to monitor pressure inside one or more hydraulic jacks associated with the mobile roof support machine.

39. (previously presented) The apparatus of claim 1, wherein at least one of said plurality of sensory indicators indicates a safe condition.

40. (previously presented) The apparatus of claim 1, wherein each of said plurality of sensory indicators indicates a different loading condition.

41. (previously presented) The apparatus of claim 1, wherein the mobile roof support unit is operable to support a mine roof during pillar extraction carried out in retreat pillar mining operations.

42. (previously presented) The apparatus of claim 1, wherein the mobile roof support unit is operable to support a mine roof during pillar extraction.

43. (previously presented) The apparatus of claim 12 further comprising means for indicating safe mining conditions.

44. (previously presented) The apparatus of claim 39, wherein said at least one of said plurality of sensory indicators indicating a safe condition is a green light.

45. (currently amended) An apparatus for monitoring ~~the~~ dynamic loading rate on hydraulic-jack-based support systems of a mobile roof support unit used in an underground mine to withstand abutment pressure, wherein the mobile roof support unit is operable to support a mine roof during retreat pillar mining operations via one or more hydraulic jacks, the apparatus method comprising:

at least one load sensing device adapted to be coupled to one or more of the hydraulic-jack-based support systems of the mobile roof support unit used in the underground mine and operable to measure measurements of hydraulic pressure within the one or more hydraulic jacks, wherein the mobile roof support unit is operable to support a mine roof during retreat pillar mining operations;

a programmable controller for processing support system loading information received from said at least one load sensing device; and

a plurality of sensory indicators located in the vicinity of said at least one load sensing device and controlled by said programmable controller to provide timely warning indications of the loading rate on the hydraulic-jack-based support systems of the mobile roof support unit based on the measurements of the hydraulic pressure within the one or more hydraulic jacks, wherein the indications are used as an aid in determining when to install additional support systems and alert miners of dangerous loading conditions on the support systems of the mobile roof support unit during mining operations on a real-time basis, wherein the mobile roof support unit is operable to support a mine roof during retreat pillar mining operations.